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Letter to the Editor: Is the Deletion of the Short Arm of Chromosome 1 a Prognostic Factor in Pediatric Peripheral Primitive Neuroepithelioma (PNET)?

Peripheral primitive neuroepitheliomas (PNET) are rare pediatric malignant soft tissue tumors that are considered very aggressive tumors, and often present with metastatic disease. Their initial response to multiagent chemotherapy and radiation therapy to the primary site is good, but about one-half of the patients may relapse soon after achievement of remission and fare poorly. In contrast, the less aggressive behavior of tumors in long-term survivors is unpredictable on a clinical and histological basis. No reliable prognostic factors have been established so far [1].

We have performed cytogenetic analysis on short-term cultures of cells derived from eight pediatric cases of PNET, age range 3–14 years (Tab 1). We evaluated 12 cases of PNET of children and obtained an abnormal karyotype in eight of them (reported data). The histological diagnosis were performed according to standard immunohistochemical, histopathologic, and ultrastructural criteria [2]. G-banded karyotypes were arranged according to the ISCN [3]. Five cases had the characteristic t(11;22)(q24;q12); in three of these, other abnormalities were also found, consisting of an abnormality in two of the distal parts of the short arm of chromosome 1. Two of the cases without t(11;22) also had chromosome 1 abnormalities; in one case a monosomy of chromosome 1 was found, whereas the other case had an additional i(1q). All the cases, with deletion or rearrangement of all or part of the 1p in one case in the additional chromosome 1), had a very poor outcome. In two of them, the tumor progressed despite chemotherapy, and the patients died shortly after diagnosis. In the two others, a complete remission was achieved, but the patients relapsed 6 and 12 months after diagnosis and died shortly after. All four patients without an abnormality of the short arm of chromosome 1 are alive without disease 18, 10, 42 and 96 months, respectively, after diagnosis.

The reciprocal translocation t(11;22)(q24;q11) is specifically associated with peripheral neuroepithelioma and Ewing's sarcoma [4]. The rearrangement of the short arm of chromosome 1 is the most frequent cytogenetic abnormality of the solid tumors in children [5]. A partial monosomy of the distal part of the short arm of the chromosome 1 is present in 50% of stage IV neuroblastomas and is frequently associated with N-myc amplification, double minutes chromosomes, and a poor prognosis [6]. A putative neuroblastoma suppressor gene has been localized to 1p36.1,36.3 [7]. The rearrangement of the short arm of the chromosome 1 has been occasionaly reported in association with the reciprocal translocation t(11;22) in peripheral neuroepithelioma [8].

Ladany et al. [8] reported the cytogenetics results of the analysis of Ewing sarcoma and PNET. Four cases presented abnormalities of chromosome 1; three of them were associated with very aggressive tumors. In accordance with the observation of Ladany et al. [8], our data suggest that in PNET also, the deletion of the short arm of chromosome 1, even if in extra copies of chromosome 1, indicates a subgroup of tumors with very poor prognosis. The same neuroblastoma oncosuppressor gene could be involved.

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TABLE I. Reported Cases of Peripheral Primitive Neuroepithelioma, Clinical Features, and Cytogenetic Results

Patients	Age (years)	Involved sites	Stage	Follow-up	Cytogenetic results
1	14	thorax, bone, bone marrow	IV	died 8 months	*46,XY,−1,+der(1)t(1;?)(p36;?)*,t(11;22)(q24;q12)/complex karyotype with modal number = 66, and der(1)t(1;?)(q36;?),t(11;22)(q24;q12)
2	10	bladder, bone bone marrow	IV	died 8 months	*54,XY,+del(1)(p22)*,+8,t(11;22)(q24;q12), +12, −17, +18, +20, +21, +mar
3	13	thorax	III	died 8 months	47,XY,+*i(1q)*,t(2;21)(p21;q22)
4	6	thorax	III	died 48 months	47,XY,−*1*,+3, −16, +2, hsr(1)(p34)
5	4	ethmoid spaces	III	alive 96 months	45,XY,21q+
6	3	pelvis	III	alive 24 months	46,XY,t(11;22)(q24;q12)
7	10	retroperitoneum	III	alive 18 months	46,XY,t(11;22)(q24;q12)
8	14	thorax	III	alive 20′ months	47,XX,+5, +8, t(11;22)(q24;q12),+18

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